

REMARKS

In the Office Action, Claims 2-9 and 12 are rejected under 35 U.S.C. §112, first paragraph; and Claims 2-9 and 12 are rejected under 35 U.S.C. §103. Claim 12 has been amended. Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The marked-up version is captioned **“Versions with Markings to Show Changes Made.”** Applicants respectfully submit that the rejections have been overcome in view of the amendments and for the reasons set forth below.

In the Office Action, Claims 2-9 and 12 are rejected under 35 U.S.C. §112, first paragraph. As previously discussed, Applicants have amended independent Claim 12. Claims 2-9 depend from Claim 12 and as a matter of law incorporate each of the features of independent Claim 12. Applicants believe that the pending claims as amended fully comply with 35 U.S.C. §112.

Accordingly, Applicants request that this rejection be withdrawn.

In the Office Action, claims 2-9 and 12 are rejected under 35 U.S.C. §103 as being unpatentable over EP0724305A1 (“*Akashi*”) in view of U.S. Patent No. 5,522,127 (“*Ozaki*”), U.S. Patent No. 5,636,437 (“*Kaschmitter*”), U.S. Patent No. 5,906,900 (“*Hayashi*”) and/or U.S. Patent No. 5,753,387 (“*Takami*”). The Examiner has primarily relied on *Akashi* and thus relies on the other secondary references to remedy the deficiencies of *Akashi*.

Of the pending claims, claim 12 is the sole independent claim. As amended, claim 12 recites a gel electrolyte secondary cell that includes a positive electrode, a negative electrode and a gel electrode. The negative electrode includes a current collector and a powder mixture including a graphitized carbonaceous material obtained from a plurality of meso-carbon micro-beads and a binder wherein the powder mixture is coated on the current collector at a thickness ranging from 10 micrometers to 200 micrometers. The gel electrolyte includes an electrolyte salt, a non-aqueous solvent at least including propylene carbonate in an amount ranging from 10 mol% to 75 mol%, ethyl carbonate and a high-molecular weight material having a number average molecular weight ranging from 5000 to 500,000.

Applicants have uniquely discovered that a gel electrolyte secondary cell which combines, for example, a negative electrode made from a current collector and coated with a negative electrode material including meso-carbon micro-beads and a gel electrolyte composed of a high molecular weight material effectively achieves a large discharge capacity and a high

charging/discharging efficiency as compared to electro-chemical cells that employ typical non-aqueous electrolytes.

In contrast, Applicants believe that the cited art fails to disclose or suggest a number of features of the claimed invention. For example, *Akashi* but merely discloses a negative electrode that can be prepared by cutting a metallic lithium plate into a sheet material having a specified thickness and surface area. See, *Akashi*, page 10, line 39-40. This clearly contrasts the claimed invention which includes, in part, a negative electrode made from a current collector and a negative electrode material coated on the current collector at a specified thickness wherein the negative electrode material includes a powder mixture including meso-carbon micro-beads and a binder as required by the claimed invention. As previously discussed, Applicants have found that a gel electrolyte secondary cell which combines this type of negative electrode and a high molecular weight gel electrolyte material can provide enhanced discharge capacity and charging/discharging efficiency. Thus, Applicant believes that *Akashi* is clearly deficient with respect to the claimed invention.

Further, Applicants believe that the secondary references cannot be relied upon to remedy the deficiencies of *Akashi*. At the outset, Applicants question whether anyone or any hypothetical combination of the secondary references can be combined with *Akashi* in the first place. In this regard, the Examiner alleges that the secondary references teach having a low surface area carbonaceous material for an electrode of a lithium secondary battery. Assuming arguendo that this correct, why would one skilled in the art be motivated to combine these purported teachings with *Akashi* to modify the negative electrode of *Akashi* to arrive at what the claimed invention requires. As previously discussed, *Akashi* merely discloses that the negative electrode can be prepared by cutting a metallic lithium plate into a sheet. Why then would one skilled in the art be motivated to modify the negative electrode of *Akashi* to include a carbonaceous electrode material as purportedly taught by the secondary references. Indeed, *Akashi* effectively teaches away from same. Of course, the Court of Appeals for the Federal Circuit has held “there is no suggestion to combine . . . if a reference [*Akashi*] teaches away from its combination with another source.” *Tec Air, Inc. v. Denso Manufacturing Michigan Inc.*, 52 USPQ2d 1294 (Fed. Cir. 1999). Thus, for at least this reason, Applicants believe that it is improper to combine the references.

Further, one skilled in the art in theory, may look to the combined teachings of the references to explain what one aspect of the claimed invention discloses. However, the Court of Appeals for the Federal Circuit have criticized this motivation to combine analysis as being "hindsight reconstructive" because the motivation to combine the cited references was first disclosed in the claimed invention. *In re O'Farrell*, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1998). As previously discussed, *Akashi* is clearly deficient with respect to the claimed invention, particularly with respect to the negative electrode features. The secondary references, on their own, are also clearly deficient with respect to the specific features of the claimed invention. Therefore, Applicants do not believe that one skilled in the art would be motivated to combine the teachings of the art, let alone modify *Akashi* in view of the art to arrive at the specific features of the gel electrolyte secondary cell as required by the claimed invention.

Even if combinable, the alleged teachings of the cited art are clearly deficient with respect to a number of features of the claimed invention. As previously discussed, *Akashi* effectively teaches away from, for example, the negative electrode features of newly amended independent claim 12. It is respectfully submitted that even if the alleged carbonaceous electrode material teachings of the secondary references are combined with *Akashi* that one skilled in the art would not be inclined to modify *Akashi* to arrive at the specific features of the claimed invention. Therefore, Applicants respectfully submit that it would be clearly improper either in law or fact to reject the claimed invention as obvious in view of the cited art.

Accordingly, Applicants respectfully request that this rejection be withdrawn.

For the foregoing reasons, Applicants respectfully request reconsideration of the present application and earnestly solicit an early allowance of same.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 12 has been amended as follows:

12. (Twice Amended) A gel electrolyte secondary cell comprising:

a positive electrode;

a negative electrode comprising a current collector and a powder mixture including a
graphitized carbonaceous material obtained from a plurality of meso-carbon micro-beads and a
binder, wherein ~~the graphitized carbonaceous material has a specific surface area that ranges~~
~~from 0.1 to less than 3.2 m²/g~~ the powder mixture is coated on the current collector at a thickness
oc ranging from 10 μm to 200 μm; and

a gel electrolyte comprising an electrolyte salt, a non-aqueous solvent at least including
propylene carbonate in an amount ranging from 10 mol% to 75 mol%, ethyl carbonate and a
high-molecular weight material having a number average molecular weight ranging from 5000 to
500000.